MAMMALIAN SPECIES No. 35, pp. 1–4, 4 figs.

Geomys tropicalis.

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Published 2 May 1974 by The American Society of Mammalogists

Geomys Rafinesque, 1817

Geomys Rafinesque, 1817:45. Type species *Geomys pinetis* Rafinesque (= *Mus tuza* Barton).

Diplostoma Rafinesque, 1817:44. Included *Diplostoma fusca* Rafinesque (= *Mus bursarius* Shaw) and *D. alba* Rafinesque (= *Mus bursarius* Shaw) from the Missouri River region.

Saccophorus Kuhl, 1820:65–66. Type species *Mus bursarius* Shaw.

Pseudostoma Say, *in* James, 1823, 1:406. Type species *Mus bursarius* Shaw.

Ascomys Lichtenstein, 1825:20. Type species *Mus bursarius* Shaw.

CONTEXT AND CONTENT. Order Rodentia, Family Geomyidae, Subfamily Geomyinae. The genus *Geomys* contains eight species. The following key will aid in identification. Three species marked with an asterisk are of questionable status (Blair *et al.*, 1968).

1 Nasals constricted near middle, giving nasals an hourglass shape; occurring in southeastern United States 2
Nasals generally tapered posteriorly giving nasals a wedge shape; not occurring in southeastern United States 5

2 (1) Fontanel on each side of skull between parietal and squamosal bones; occurring in vicinity of Savannah, Chatham Co., Georgia ..... **Geomys fontanelus*
No fontanel between parietal and squamosal bones ... 3

3 (2) Union of zygomatic arches with skull extending posteriorly and forming a sharper angle in the temporal fossa; occurring exclusively on Cumberland Island, Camden Co., Georgia ..... **Geomys cumberlandius*
Zygomatic arches form greater angle with skull and are not extended posteriorly 4

4 (3) Interpterygoid space broadly U-shaped; nasals not strongly constricted at middle; occurring in vicinity of St. Marys, Camden Co., Georgia .. **Geomys colonus*
Interpterygoid space broadly V-shaped; nasals strongly constricted at middle ..... *Geomys pinetis*

5 (1) Width of rostrum equal to or less than greatest length of basioccipital 6
Width of rostrum greater than greatest length of basioccipital ..... *Geomys bursarius*

6 (5) Squamosal arm of zygomatic arch lacking prominent knob over middle of jugal, mesopterygoid fossa U-shaped; occurring in South Texas and Tamaulipas .. *Geomys personatus*
Squamosal arm of zygomatic arch ending in prominent knob over middle of jugal, mesopterygoid fossa V-shaped 7

7 (6) Sides of zygomatic arch parallel; sagittal crest absent; interparietal subquadrate; border of premaxilla at incisive foramina is wedge shaped; occurring in West Texas, New Mexico, and Chihuahua ..... *Geomys arenarius*
Sides of zygomatic arch become narrower posteriorly; sagittal crest if present is small; interparietal triangular; border of premaxilla at incisive foramina subquadrate; occurring in vicinity of Tampico, Tamaulipas ..... *Geomys tropicalis*

Geomys tropicalis Goldman, 1915
Tropical Pocket Gopher

Geomys personatus tropicalis Goldman, 1915:134. Type locality Altamira, Tamaulipas, Mexico.

Geomys tropicalis Alvarez, 1963:426.

CONTEXT AND CONTENT. Context as given above. *Geomys tropicalis* is a monotypic species.

DIAGNOSIS. *Geomys tropicalis* is more closely related to *G. personatus* and *G. arenarius* than to other species of *Geomys* (Alvarez, 1963). Color is similar to that of *G. p. personatus* or *G. p. fallax* with dorsal coloration between cinnamon and cinnamon-buff, which fades laterally toward the venter. The top of the head and back are thinly overlaid with brown hair. The feet and underparts are covered with white hair. The tail is nearly naked and is flesh colored. The above description of color was taken from Goldman (1915). Cranial features (see figure 1) include: zygomatic arches that narrow posteriorly, a small sagittal crest, a squamosal knob, a triangular interparietal, a V-shaped mesopterygoid fossa, and a subquadrate border of premaxilla at incisive foramina (Alvarez, 1963). *Geomys tropicalis* also differs from *G. personatus* and *G. arenarius* karyotypically. *G. tropicalis* has a diploid number of 38 chromosomes (figure 3) and a fundamental number of 72 autosomal arms, whereas *G. personatus* has a diploid number rang-

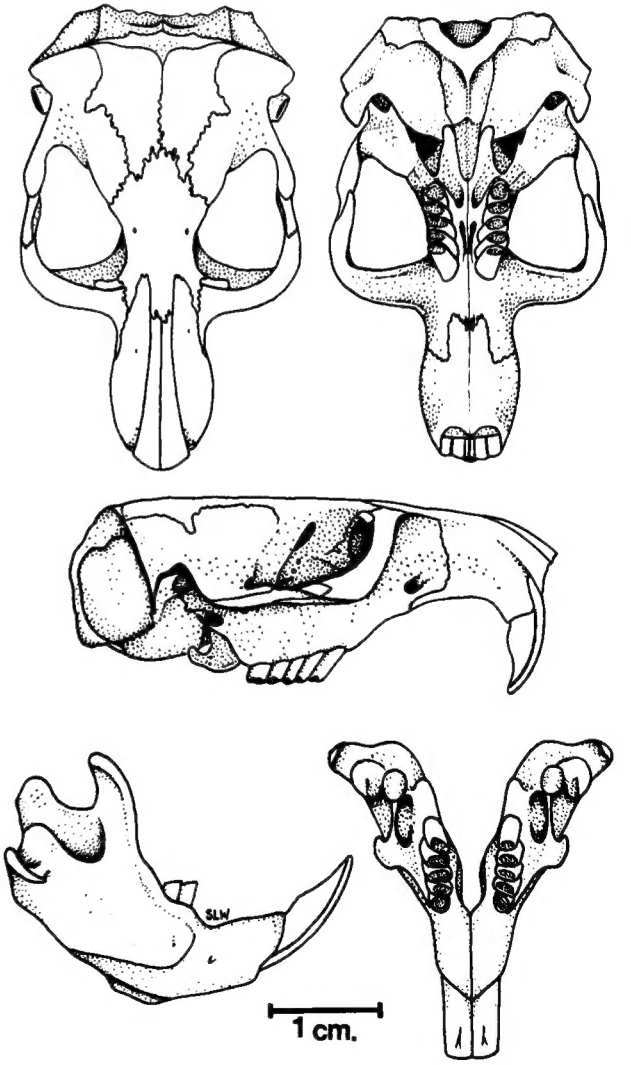

FIGURE 1. Dorsal, ventral, and lateral views of cranium, and lateral and occlusal views of lower jaw of *Geomys tropicalis* (TTU 8142, female from 2.5 mi. SE Altamira, Tamaulipas, México).

FIGURE 2. Adult female *Geomys tropicalis*. Note the enlarged front feet, the fusiform body shape, the reduced pinnae, and the naked tail.

ing from 68 to 72 and a fundamental number ranging from 70 to 76, and *G. arenarius* has a diploid number of 70 and a fundamental number of 102 (Davis *et al.*, 1971).

GENERAL CHARACTERS. A medium-sized fossorial rodent characterized by the following features, which it shares with other members of the genus: a thick set body; small eyes; reduced pinnae; stout, strong-clawed forelegs (figure 2); large fur-lined cheek pouches that open externally; a dental formula of i 1/1, c 0/0, p 1/1, m 3/3, total 20; all teeth evergrowing; enamel on the anterior surface of the incisors bisulcate; enamel on cheekteeth greatly reduced.

External measurements (in millimeters) of the holotype are total length 270, tail vertebrae 86, and hind foot 33 (Goldman, 1915). Average and extreme measurements taken from Alvarez (1963), of five females and individual measurements of three males from 1 mi. S Altamira are as follows: total length 243.5 (235 to 250), 260, 260, 265; tail vertebrae 82.0 (78 to 85), 87, 93, 89; hind foot 32.2 (31 to 33), 35, 35, 33; ear from notch in both sexes 5; condylobasal length 42.3 (41.3 to 43.1), 46.0, 48.0, 46.2; zygomatic breadth 26.6 (25.1 to 27.7), 30.4, 31.2, 30.5; interorbital constriction 6.2 (6.1 to 6.3), 6.0, 6.2, 6.3; length of nasals 14.6 (14.0 to 15.3), 17.0, 16.8, 15.9; and alveolar length of maxillary tooth row 9.0 (8.6 to 9.3), 9.9, 10.0, 9.4.

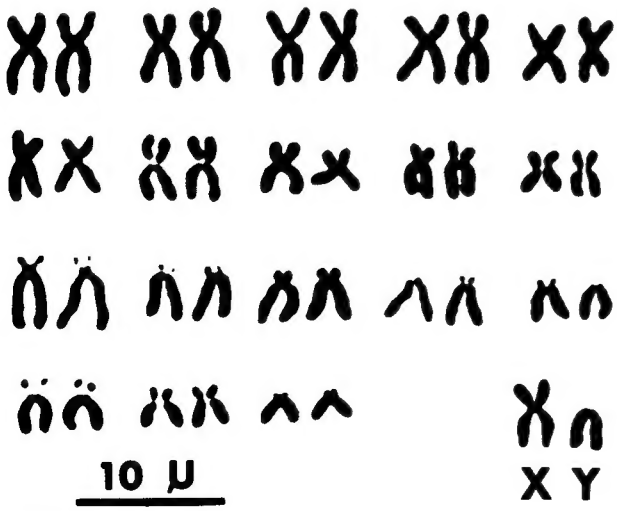

FIGURE 3. Representative karyotype of a male *Geomys tropicalis*.

DISTRIBUTION. Specimens of *G. tropicalis* are known only from the southeastern tip of Tamaulipas, specifically from Altamira, 1 mi. S Altamira, 2.5 mi. S Altamira, and 10 mi. NW Tampico (figure 4). All of these localities are along the highway connecting Altamira and Tampico. Three investigations by field parties from Texas Tech University in the vicinity of the type locality suggest that this species has an extremely limited distribution.

FOSSIL RECORD. The genus probably separated from an ancestral stock that give rise to *Orthogeomys*, *Zygogeomys*, and *Pappogeomys* in the late Pliocene (Russell, 1968:544). The genus has a rather rich fossil history, which was reviewed by Russell (1968). Relative to the recent species, there are fossils that reveal a late Pleistocene divergence within the genus that gave rise to two groups, the *G. pinetis* group (consisting of *G. pinetis*, *G. fontanelus*, *G. cumberlandius*, and *G. colonus*) and the *G. bursarius* group (consisting of *G. bursarius*, *G. personatus*, *G. arenarius*, and *G. tropicalis*). The records of *Geomys* from the Miocene and Pliocene are without foundation (for a review see Russell, 1968:485).

The family dates from the Miocene of western North America and, except for minor invasions into Central and South America, the family is believed to be autochthonous to North America.

FORM. Based on the few measurements given by Alvarez (1963) there is sexual dimorphism in this species. In eight of nine measurements, males averaged larger than females. Ear measurements of both sexes were the same but in these fossorial mammals the ear is much reduced and its measurement lacks the precision that would be needed to reflect minor differences in size that may exist.

No information is available on the postcranial skeleton or soft anatomy of this species.

FUNCTION. No physiological data are published for this species.

ECOLOGY. There are no published data directly concerned with the ecology of *G. tropicalis*. Goldman (1951) described the area as being a gently rolling, rather sandy plain approximately 25 m in elevation. The flora was typical of arid, grassy plains with scattered chaparral, oaks, ojite, guayoba,

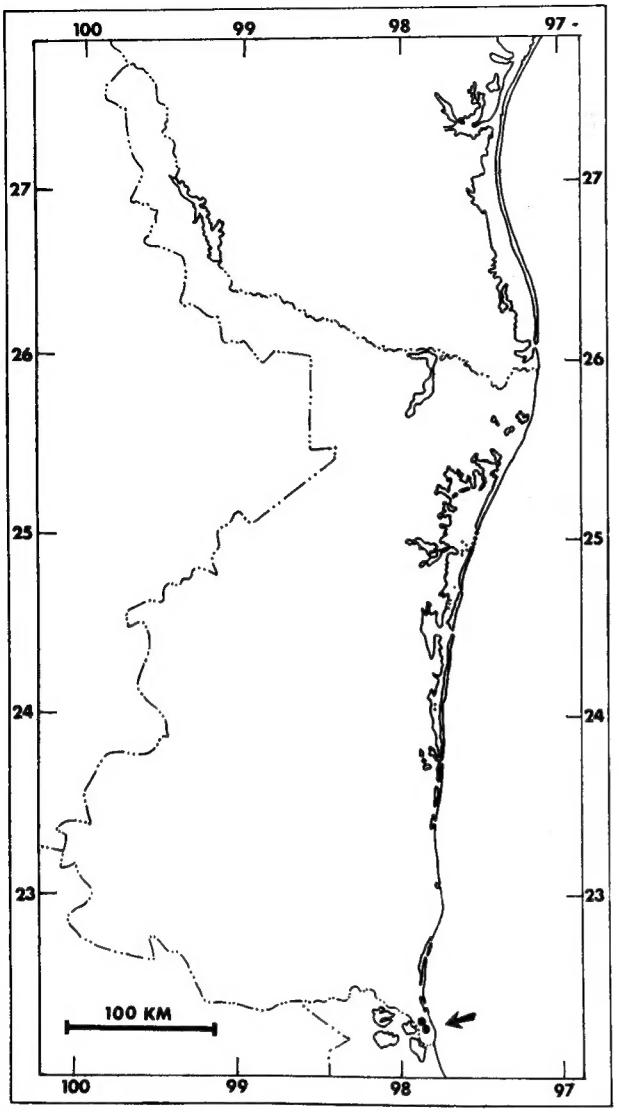

FIGURE 4. Map of the state of Tamaulipas, México, showing the small range of *Geomys tropicalis* in the southern tip of the state.

mesquite, acacias, and cactus. *G. tropicalis* is restricted to the areas of deep sandy soil.

This species spends most of its life underground and surfaces periodically for short intervals of time. Surfacing is usually followed by the formation of a characteristic mound, which is made as the pocket gopher plugs the open burrow.

One possible predator of *G. tropicalis* is the spotted skunk, *Spilogale*. Three individuals were collected from burrows of this gopher while eating animals previously caught in kill-type traps. It is possible that these small skunks enter open gopher burrows and prey on the occupants.

A single species of mallophagan, *Geomydoecus texanus*, has been reported from *G. tropicalis* (Price and Emerson, 1971). Although the type-host of *Geomydoecus chapini* Werneck (1945) was reported as *Geomys tropicalis*, the gopher from which these lice were taken was probably an *Orthogeomys* (Price and Emerson, 1971).

REPRODUCTION AND ONTOGENY. There are no published data on reproduction and ontogeny in this species.

GENETICS. The karyotype of *G. tropicalis* is known from five males and one female collected 2.5 mi. south of Altamira. No chromosomal variation was found within these six specimens. The diploid number is 38, which is low in relation to values for most other pocket gophers (Patton and Dingman, 1969, 1970; Thaeler, 1968; Berry and Baker, 1971; Davis *et al.*, 1971). Davis *et al.* (1971) believed that the low diploid number of *G. tropicalis* resulted from many centric fusions in a karyotype similar to that characteristic of *G. personatus*. Inasmuch as *G. tropicalis* has such a limited distribution and is restricted to a specific habit, this low diploid number may be advantageous in adapting to specific conditions. That is, if all other factors remain constant, the Mendelian variation is reduced by reducing the diploid number.

ETYMOLOGY. The word *Geomys* is from the Greek word roots *Geo*, meaning "earth," and *mys*, meaning "mouse." The specific name, *tropicalis*, originates from the Greek word *tropic*, meaning "tropical," and the Latin suffix *alis*, meaning "pertaining to."

REMARKS. *Geomys tropicalis* was originally believed to be a subspecies of *G. personatus* (Goldman, 1915). Although *tropicalis* now is regarded as distinct at the species level, the two are closely related, having probably diverged from one continuous population since the Wisconsin glacial period (Selander *et al.*, 1962). This theory is supported by the fact that the two species share the same species of ectoparasite, *Geomydoecus texanus* (Price and Emerson, 1971). Further indication is the occurrence of *G. personatus* on the Tamaulipas barrier islands 185 miles north of Altamira (Selander *et al.*, 1962).

There are only four papers that report original data for this species (Goldman, 1915; Alvarez, 1963; Davis *et al.*, 1971; and Price and Emerson, 1971). One reason for the small amount of new information published since the original description is the restricted distribution of the species. Small population size as a result of a limited geographic distribution presents a number of problems to a species, such as maintaining heterozygosity and genetic variability. Because the population density of *G. tropicalis* appears to be relatively high, this species is ideal for biological studies of a species with minimal genetic input. Care must be taken, however, not to jeopardize the future of *G. tropicalis*.

During the period from 1969 to 1972, we have noticed considerable change in land usage in the area inhabited by *G. tropicalis*. The area is being subdivided into small lots and increased agricultural use is being made of the land. It will be important to carefully monitor the populations of *G. tropicalis* to determine the measures required to preserve this valuable species if the human pressure becomes too great.

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